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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,090	03/23/2004	Tetsuya Hoya	0051-0221PUS1	1875

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EXAMINER	
FERNANDEZ RIVAS, OMAR F	
ART UNIT	**PAPER NUMBER**
2129	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	02/06/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 02/06/2007.

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Office Action Summary	Application No. 10/806,090	Applicant(s) HOYA, TETSUYA
	Examiner Omar F. Fernández Rivas	Art Unit 2129

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 09 November 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-15 and 18-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-15 and 18-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 23 March 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to an AMENDMENT made by the Applicant filed on November 9, 2006.

2. The Office Action of May 15, 2006 is incorporated into this Non-Final Office Action by reference.

Status of Claims

3. Claims 1, 8, 13 and 20 have been amended. Claims 16 and 17 have been cancelled. Claims 1-15 and 18-21 are pending on this application.

Information Disclosure Statement

4. The information disclosure statement has not been filed for this application. To comply with 37 CFR 1.98(a)(1), the following is required: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 2, 4-6, 10, 11, 13, 15, 18, 20 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 2, 4-6, 10, 11, 15, 18, 20 and 21 recite "**the** each neuron" at different parts of each claim. The Examiner cannot determine the metes and bounds of the limitations in the claims because the language raises confusion. The use of the word "the" (singular) with the word each (plural) does not make it clear if the limitation is referring to a single neuron or a plurality of neurons.

Claim 13 recites: "a second step of repeating **following** processing (a) to (c)..." It is not clear if the limitation means that something will be repeated following the processings (a) to (c) or if it means that processings (a) to (c) will be described next.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-15 and 18-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kevin Gurney ("An Introduction to Neural Networks", referred to as **Gurney**).

Claim 1

Gurney anticipates an interconnecting neural network system (**Gurney**: page 1, L16-24) comprising: a neural network unit that includes a plurality of neurons (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; Figs 1.2 and 1.3), each of the neurons outputting an excitation strength according to a similarity between an input vector and a

centroid vector based on a kernel function (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 14, L1-27; page 182, L15 to page 185, L21; Figs 1.2, 1.3, 2.4; Examiner's Note (EN): the activation (excitation strength) is calculated by the difference ||x-w|| (similarity). Radial Basis Function is a kernel function. Moreover, any function used by the neuron to provide its activation is a kernel function); and network control unit that constructs an artificial neural network structure by interconnecting neurons relating to each other among the neurons in the neural network unit via a weight (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; Figs 1.2 and 1.3; EN: learning will develop a final structure for the neural network. The weights will relate the nodes in the final structure), wherein each of the neurons in the neural network unit outputs an excitation strength according to a similarity between an input vector and a centroid vector based on a kernel function when the each neuron is excited by the input vector applied from an outside (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 14, L1-27; page 182, L15 to page 185, L21; Figs 1.2, 1.3, 2.4; EN: depending on the input vector, activation (excitation) will be calculated. The input vector must be provided from somewhere), and outputs a pseudo excitation strength obtained based on an excitation strength output from the other neuron when the each neuron is excited in a chain reaction to excitation of the other neuron connected to the each neuron (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 14, L1-27; page 182, L15 to page 185, L21; Figs 1.2, 1.3, 2.4; EN: the activation (excitation strength) of each neuron will be the input to a neuron in a successive layer (chain reaction). The activation calculated by the neurons or the RBF units are considered pseudo excitation strength as understood

from paragraph 60 of the present application), wherein the neurons in the neural network unit have a plurality of modalities different from one another (**Gurney**: pages 44-46, sections 4.4 to 4.5.2; page 182, L15 to page 185, L21; EN: the association units will provide each neuron the functionality of operating on different input data by dividing the input pattern into a grid and providing an output based on the input pattern, therefore providing different modalities for the neuron. Moreover, if the neuron can classify two classes, then it has a plurality of modalities, since it can provide a response for different input data. Moreover, each RBF will have a different centre and provide a contribution top the output).

Claim 2

Gurney anticipates each neuron in the neural network unit outputs the pseudo excitation strength and also outputs the centroid vector of the each neuron when the each neuron is excited in a chain reaction to the excitation of the other neuron connected to the each neuron (**Gurney**: page 182, L15 to page 185, L21; EN: calculating the activation is calculating the activation is calculating the excitation strength. The centroid vector is the weight vector and it will be provided (outputted) to the next node connected (weighted connections) to the node).

Claims 3 and 9

Gurney anticipates the network control unit interconnects the neurons relating to each other among the neurons in the neural network unit, based on an order of the neurons added or excited at time series in association with a plurality of input vectors applied to the neural network unit from the outside (**Gurney**: page 1, L16-24; page 2,

L19 to page 3, L9; page 14, L1-27; Figs 1.2 and 1.3; EN: learning will develop a final structure for the neural network. During training, the neurons will be added (connected) or excited on a layer-by-layer basis. Since each neuron will have to wait to receive data from a neuron in a preceding layer, the interconnections will be made in time series).

Claims 4 and 15

Gurney anticipates the network control unit trains the weight that connects the neurons to each other, based on the excitation strength of the each neuron in the neural network unit (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 4, L10-31; page 14, L1-27; pages 39-44, sections 4.1-4.4; EN: learning is training. Each neuron will provide an output as input to the nodes to which it is connected).

Claims 5 and 10

The network control unit removes the each neuron at a predetermined timing determined based on the excitation strength of the each neuron in the neural network unit (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 4, L10-31; page 14, L1-27; pages 39-44,sections 4.1-4.4; EN: the weights will determine the strength of the connections, therefore connecting or disconnecting (removing) neurons during training).

Claim 6

Gurney anticipates the each neuron in the neural network unit is an intermediate layer neuron using, as the centroid vector, centroid data in a matrix form in light of time series changes, and the each intermediate layer neuron is connected to an output layer neuron that outputs a change in the excitation strength output from the each intermediate layer neuron at time series (**Gurney**: page 182, L15 to page 185, L21;

Fig10.15; EN: a vector is considered a one row matrix. Training will update the weight vector (time series changes)).

Claims 7, 11, 18 and 21

Gurney teaches the kernel function employed in the each neuron in the neural network unit includes a radial basis function (**Gurney**: page 182, L15 to page 185).

Claim 8

Gurney anticipates a method of constructing an interconnecting neural network structure (**Gurney**: page 1, L16-24), the method comprising the steps of: preparing an artificial neural network structure including a plurality of neurons (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; Figs 1.2 and 1.3), each of the neurons outputting an excitation strength according to a similarity between an input vector and a centroid vector based on a kernel function (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 14, L1-27; page 182, L15 to page 185, L21; Figs 1.2, 1.3, 2.4; Examiner's Note (EN): the activation (excitation strength) is calculated by the difference ||x-w|| (similarity). Radial Basis Function is a kernel function. Moreover, any function used by the neuron to provide its activation is a kernel function), the neurons relating to each other interconnected in the artificial neural network structure via a weight (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; Figs 1.2 and 1.3; EN: learning will develop a final structure for the neural network. The weights will relate the nodes in the final structure); and training the weight that connects the neurons to each other, based on the excitation strength of the each neuron (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 4, L10-31; page 14, L1-27; pages 39-44, sections 4.1-4.4; learning is training. Each

neuron will provide an output as input to the nodes to which it is connected), wherein the neurons in the artificial neural network structure have a plurality of modalities different from one another (**Gurney**: pages 44-46, sections 4.4 to 4.5.2; page 182, L15 to page 185, L21; EN: the association units will provide each neuron the functionality of operating on different input data by dividing the input pattern into a grid and providing an output based on the input pattern, therefore providing different modalities for the neuron. Moreover, if the neuron can classify two classes, then it has a plurality of modalities, since it can provide a response for different input data. Moreover, each RBF will have a different centre and provide a contribution top the output).

Claims 12 and 19

Gurney anticipates a computer readable recording medium storing an interconnecting neural network structure construction program that allows a computer to execute the method according to claim 8 (**Gurney**: page 1, L16-24; EN: Neural networks are computer systems. Computers must have programs stored in some medium in order to perform its operations).

Claim 13

Gurney anticipates a method of constructing a self-organizing neural network structure including a plurality of neurons (**Gurney**: page 115 to page 118, section 8.2; page 185, L12-21), each of the neurons outputting an excitation strength according to a similarity between an input vector and a centroid vector based on a kernel function (**Gurney**: page 182, L15 to page 185, L21; Fig. 2.4; Examiner's Note (EN): the activation (excitation strength) is calculated by the difference ||x-w|| (similarity). Radial

Basis Function is a kernel function), the neurons relating to each other being autonomously connected in the self-organizing neural network structure based on the input vector (**Gurney**: page 115 to page 122, section 8.2.1), the method comprising: a first step of adding a neuron, which has an input vector as a centroid vector for a kernel function, into the self-organizing neural network structure as a new neuron based on an input vector that is input first from an outside (**Gurney**: page 115 to page 122, section 8.2.1; page 182, L15 to page 185, L21; EN: during training, lateral connections will be made based on the input vector); and a second step of repeating following processings (a) to (c), each of the processings being based on an input vector that is an n^{th} input vector from the outside, where n is an integer equal to or greater than 2: (a) the processing of calculating excitation strengths of all the neurons in the self-organizing neural network structure based on the n^{th} input vector input from the outside; (b) the processing of adding a neuron, which has the n^{th} input vector as a centroid vector for a kernel function, into the self-organizing neural network structure as a new neuron in case that it is determined by the processing (a) that there is no neuron excited such that the excitation strength thereof exceeds a predetermined threshold, among one or a plurality of neurons in the self-organizing neural network structure; and (c) the processing of performing both of or one of formation of a weight that connects the neurons, and training of the formed weight based on the excitation strengths of the neurons in the self-organizing neural network structure (**Gurney**: page 115 to page 120, L25; page 185, L12-21).

Claim 14

Gurney anticipates in the second step, a processing (d) of removing a neuron determined to be unnecessary based on the excitation strengths of the neurons in the self-organizing neural network structure is further performed (**Gurney**: page 116 to page118, section 8.1; page 127 to page 129, section 8.3.3; EN: inhibitory connections will remove neurons. Moreover, if a neuron is "off" it has been removed).

Claim 15

Gurney anticipates each of the neurons in the self-organizing neural network structure holds a class label relating to a final output, and, in the processing (c) in the second step, only in case that the class label held by the each neuron in the self-organizing neural network structure is identical, both of or one of the formation of the weight that connects the neurons, and the training of the formed weight is performed based on the excitation strengths of the neurons (**Gurney**: pages 135-136, section 8.3.6).

Claim 20

Gurney anticipates an interconnecting neural network system comprising: a plurality of intermediate layer neurons (**Gurney**: page 71, section 6.6, L1-4; page 72, Figs. 6.4 and 6.5; page 184, L13-16; Fig 10.15), each of the intermediate layer neurons outputting an excitation strength according to a similarity between an input vector and a centroid vector based on a kernel function (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 14, L1-27; page 182, L15 to page 185, L21; Figs 1.2, 1.3, 2.4;

Examiner's Note (EN): the activation (excitation strength) is calculated by the difference ||x-w|| (similarity). Radial Basis Function is a kernel function) and each of the intermediate layer neurons using centroid data in a matrix form in light of time series changes as the centroid vector (**Gurney**: page 182, L15 to page 185; Fig. 10.15; EN: a vector is considered a one row matrix. Training will update the weight vector (time series changes)); an output layer neuron connected to each of the intermediate layer neurons and outputting a change in the excitation strength output from the each intermediate layer neuron at time series (**Gurney**: page 1, L16-24; page 2, L19 to page 3, L9; page 14, L1-27; page 182, L15 to page 185, L21).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kramer et al. US Patent #5,335,291

Mita US Patent #6,243,490

10. Claims 1-15 and 18-21 are rejected.

Correspondence Information

11. Any inquires concerning this communication or earlier communications from the examiner should be directed to Omar F. Fernández Rivas, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-2589 or email omar.fernandezrivas@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, David Vincent, may be reached at (571) 272-3080.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Omar F. Fernández Rivas
Patent Examiner
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United States Department of Commerce
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Thursday, February 01, 2007

OFR

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